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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,026	10/28/2003	Sunil Thomas	TI-29525.1A	5704

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EXAMINER

BEREZNY, NEMA O

ART UNIT PAPER NUMBER

2813

DATE MAILED: 04/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/695,026	Applicant(s) THOMAS, SUNIL	
	Examiner Nema O. Berezny	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 February 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 24-43 is/are pending in the application.
- 4a) Of the above claim(s) 36-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 24-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                         |                                                                             |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                                |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____                                                             | 6) <input type="checkbox"/> Other: _____                                    |

Art Unit: 2813

### **DETAILED ACTION**

This Office Action is in response to Applicant's Amendment, filed 2-2-05 which has been entered and considered. Claims 24-44 are pending, with claims 36-44 withdrawn.

#### ***Specification***

The objection to specification (abstract) made in prior Office Action is hereby withdrawn, subsequent to corrections made by Applicant in paper filed 2-2-05.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 24-35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 24 claims inter alia a protective coated wafer containing a plurality of chips with micromechanical components, and a lid adhered to an opening in a substrate connected to said chip. However, instant specification discloses that the protective material applied to the wafer is removed before the lid is adhered to the substrate (p.20 lines 6-14; Figs.7-9). Instant

Art Unit: 2813

specification also discloses that both sides of the opening are closed by the lid, solder bumps, and underfill material to form a fully enclosed package (p.21 lines 22-27).

Therefore, the protective coating could not be removed after adhering the lid to the substrate. Correction is required.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 24-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Independent claim 24 claims a wafer with a plurality of semiconductor chips with micromechanical components. Independent claim 24 claims additional features including the chip being solder connected to a substrate with an opening therethrough, encapsulation in the soldered area, and a lid adhered across the opening. Said additional features are disclosed only for a diced chip and not for a wafer. Applicant appears to be claiming both an intermediate product of a protective coated wafer, and a finished product of an individual packaged chip in the same independent claim. Correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2813

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 24, 27-28, 31, and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Najafi et al. (WO 98/05935) in view of Karpman et al. (6,534,340). Najafi discloses a packaged micromechanical device, comprising: a semiconductor chip (Figs.1a,2a,2f el.1) having an integrated circuit including a plurality of micromechanical components (el.4) configured in a plane in the central portion of a first surface of said chip, and a plurality of terminals (el.10) disposed in peripheral portions of said first surface of said chip; an electrically insulating substrate (el.2) having first and second surfaces and an opening (el.3), said surfaces being substantially parallel to each other; a protective material coated on said micromechanical components (Fig.4a el.18); a plurality of electrically conductive routing lines (el.8) integral with said substrate; a first plurality of contact pads (el.7) disposed on said first surface of said substrate, adjacent said opening and connected to at least one of said routing lines; a second plurality of contact pads (el.6) disposed on said first surface of said substrate, remote from said opening and connected to at least one of said routing lines; solder (el.5) electrically connecting said terminals in peripheral portions of said first surface of said chip to said first plurality of contact pads, such that said first surface of said chip covers said opening in said substrate; an encapsulant (el.14) between said first surface of said chip and said substrate around said opening, said encapsulant leaving a second surface of said chip exposed; and a lid (el.27) adhered to said second surface of said substrate covering said opening in said substrate. However, Najafi does not disclose a

wafer including a plurality of said chips. Najafi would look to one such as Karpman for reduced processing time and costs because Karpman discloses a wafer including a plurality of MEMS chips (col.2 lines 7-16). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the wafer of Karpman with the device of Najafi in order to reduce the time and costs of chip fabrication **[claim 24]**.

Najafi also discloses wherein said insulating substrate is made of ceramic having a single level metallization (Fig.1a; p.6 lines 9-10) **[claim 27]**; wherein said conductive routing lines and said first and second pluralities of contact pads are in said single level metallization (Fig.1a) **[claim 28]**; wherein said solder is selected from a group consisting of lead/tin, indium, tin/indium, tin/silver, tin/bismuth, solder paste, and solder-coated spheres (p.6 lines 16-18) **[claim 31]**; and having a plurality of solder balls (el.5') disposed on said second plurality of contact pads (Fig.1b) **[claim 35]**.

Based upon the rejection of claim 24 above, Najafi does not disclose adhering said lid to said substrate. However, Najafi would look to one such as Karpman for fabrication flexibility because Karpman discloses wherein said lid is adhered to said second substrate surface by an epoxy adhesive (col.3 lines 35-45). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the adhesive of Karpman with the device of Najafi because said adhesive can be applied to either the chip or the substrate surfaces (Karpman - col.4 lines 37-51) **[claim 34]**.

Claims 25-26, 29-30, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Najafi in view of Karpman as applied to claim 24 above, and further in view of Fisher et al. (5,936,758). Najafi and Karpman do not disclose a digital micromirror device, a passivant, or a glass plate. However, Najafi and Karpman would look to one such as Fisher for a deformable element, lubricated micromechanical parts, and a transparent lid. Fisher discloses wherein said micromechanical device is a digital micromirror device, and wherein said micromechanical components are micromirrors (col.1 lines 33-39). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the micromirrors or digital micromirror device of Fisher with the device of Najafi and Karpman in order to provide deformable micromechanical elements (Fisher – col.1 lines 58-62) **[claims 25, 26]**.

Fisher also discloses ridge-like protrusions (Fig.1 el.70) formed in said ceramic substrate and positioned under said lid, suitable for storing a passivant (Fig.1). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the protrusions of Fisher with the device of Najafi and Karpman in order to provide a non-electrical surface for storing a material to lubricate moving parts (col.1 lines 25-33; col.6 lines 25-34) **[claim 29]**. Fisher also discloses wherein said passivant is a pill or granular material suitable for gradual release to continuously coat contacting surfaces of said micromechanical components (col.6 lines 30-34). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the passivant of Fisher with the device of Najafi and Karpman in

order to provide continuously coated or lubricated micromechanical surfaces (col.6 lines 35-37) **[claim 30]**.

Fisher also discloses wherein a lid is a plate made of glass or any other material transparent to light in the visible range of the electromagnetic spectrum (col.1 lines 33-39; col.6 line 42). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the glass plate of Fisher with the device of Najafi and Karpman in order to provide a sealed package for light sensor devices **[claim 33]**.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Najafi in view of Karpman as applied to claim 24 above, and further in view of Shiobara et al. (6,310,120). Najafi and Karpman disclose an encapsulant (p.6 lines 22-24), but do not disclose an epoxy encapsulant filled with silica and anhydrides. However, Najafi and Karpman would look to one such as Shiobara for a curing agent and to reduce the coefficient of thermal expansion (CTE) because Shiobara discloses wherein said encapsulant comprises an epoxy-based material filled with silica and anhydrides (col.2 lines 56-64; col.3 lines 38-49). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the encapsulant of Shiobara with the device of Najafi and Karpman in order to provide a reduced CTE (col.3 lines 43-45) and to provide a curing agent (col.2 lines 56-64).



***Response to Arguments***

Applicant's arguments with respect to claims 24-35 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nema O. Berezny whose telephone number is (571) 272-1686. The examiner can normally be reached on M-F 9-5:30.

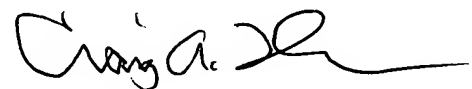
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on (571) 272-1702. The fax phone

Art Unit: 2813

number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NB

A handwritten signature in black ink, appearing to read "Craig A. Thompson", with a long horizontal flourish extending to the right.

**CRAIG A. THOMPSON**  
**PRIMARY EXAMINER**